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## RESEARCH

### Condições de saúde da criança acometida por paralisia cerebral na Estratégia Saúde da Família

Conditions of child health stricken by cerebral palsy in Family Health Strategy

Condiciones de salud infantil golpeados por parálisis cerebral en Familia Estrategia de Salud

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#### ABSTRACT

**Objective:** To investigate the child's health condition with cerebral palsy accompanied in the Family Health Strategy. **Method:** Descriptive, exploratory and cross-sectional study, conducted with 13 children 1-12 years old. Through home visits investigating socioeconomic and health conditions, physical examination, vital signs, pneumofunctional evaluation and testing of the gross motor function classification system. **Results:** The majority of children a family income of up to 2 minimum wages, are benefited by the National Institute of Social Security, use the services of the National Health System also submitted respiratory function unchanged, growth putting structural suitable for age, prevalence of quadriplegia spastic, use of anticonvulsant medication, respiratory problems last year as influenza and pneumonia. **Conclusion:** It was observed that the higher the motor impairment developed more comorbidities. Children with cerebral palsy accompanied by the Family Health Program in Teresina, PI, are in proper health. **Descriptors:** Cerebral palsy, children, health.

#### RESUMO

**Objetivo:** Investigar as condições de saúde das crianças com paralisia cerebral acompanhadas na Estratégia Saúde da Família. **Método:** Pesquisa descritiva, exploratória e transversal, realizada com 13 crianças de 1 a 12 anos de idade. Através de visitas domiciliares investigando condições socioeconômicas e de saúde, exame físico de sinais vitais, avaliação pneumofuncional e testes do sistema de classificação da função motora grossa. **Resultados:** A maioria das crianças possui renda familiar de até 2 salários mínimos, são beneficiadas pelo Instituto Nacional de Seguridade Social, utilizam os serviços do Sistema Único de Saúde. Apresentaram ainda função respiratória inalterada, crescimento pondo-estrutural adequado para idade, predomínio da quadriplegia espástica, uso de medicação anticonvulsivante, problemas respiratórios no último ano como gripe e pneumonia. **Conclusão:** Observou-se que quanto maior o comprometimento motor mais comorbidades desenvolvidas. As crianças com paralisia cerebral acompanhadas pela Estratégia Saúde da Família em Teresina-PI encontram-se em condições de saúde adequada. **Descritores:** Paralisia cerebral, crianças, saúde.

#### RESUMEN

**Objetivo:** Investigar la condición de salud del niños con parálisis cerebral acompañado en la Estrategia Salud de la Familia. **Método:** Estudio descriptivo, exploratorio y estudio transversal, realizado con 13 niños de 1-12 años de edad. A través de visitas domiciliarias que investigan las condiciones socioeconómicas y de salud, un examen físico, signos vitales, evaluación pneumofuncional y pruebas del sistema de clasificación de la función motora bruta. **Resultados:** La mayoría de los niños con un ingreso familiar de hasta 2 salarios mínimos, son beneficiados por el Instituto Nacional de la Seguridad Social, usan los servicios del Sistema Nacional de Salud la función respiratoria también presentado sin cambios, el crecimiento poniendo adecuado estructural para la edad, la prevalencia de quadriplegia espástica, uso de medicación anticonvulsivante, problemas respiratorios el año pasado como la gripe y la neumonía. **Conclusión:** Se observó que a mayor deterioro motor desarrollado más comorbilidades. Los niños con parálisis cerebral, acompañados por el Programa de Salud Familiar en Teresina, PI, están en la salud adecuada. **Descriptor:** Parálisis cerebral, los niños, la salud.

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## INTRODUCTION

**C**hronic brain injury non-progressive or Cerebral Palsy (CP) can be defined as a disorder of posture and movement, persistent, but not immutable caused by damage to the central nervous system (CNS) in development before, during birth or in first months of infancy. The condition causes difficulties variables in the coordination of muscle action with resulting child's inability to maintain postures and movements make normais.<sup>1</sup>

Affected individuals have complex motor changes being the primary deficits are abnormal muscle tone affecting posture and movement; change the balance and coordination; loss of strength; selective loss of motor control with secondary problems of contractures and deformities ósseas.<sup>2</sup> In addition to changes in body biomechanics, the child may have cognitive disorders, sensitive, visual and hearing that, added to the motor changes, task constraints and the repercussions environment of different shapes in their functional performance. CP children generally grow less, with lower weight and height than healthy the same age. Emphasize these authors, and evolve with height and lower weight also have a lower resistance to infections, stressing the importance of normal brain for a physical constitution normal.<sup>3</sup>

It is estimated that for every 1,000 children born, 7 are carriers of PC. In developing countries such as Brazil, this condition may be related to pregnancy problems, poor maternal and child nutrition, medical care and hospital often inadequate given the demand of clinical conditions mainly by children born before the correct neurological maturation.<sup>4</sup>

The high incidence probably is due to the quality of pre- and perinatal care deficit for most of the população.<sup>5</sup> There are references to causes of pre and peri native origin of Cerebral Palsy, these can be divided into four major groups: malformations of the nervous system central, infections by infectious agents that can be transmitted to the fetus during pregnancy and to acute and chronic hypoxia, besides the occurrence of prematuridade.<sup>6</sup>

It has been shown in studies that the families of children with CP were not covered by the hierarchy and the completeness of the services offered by the public health system. Family members report difficulties of access to the basic health unit, and the fact that the staff did not know the child's history is very important for families do not seek their services. These children then seek health care already during hospitalization, with multiple complications, requiring hospitalization, multiple drugs and higher spending financeiro.<sup>7</sup>

The paper studied, child health conditions affected by cerebral palsy enrolled in the Family Health Strategy, in the north of Teresina, PI.

The literature is rich in data on children engine frame with cerebral palsy, however scarce when investigating other systems, they are also limited by the difficulty of movement and postural changes resulting from brain injury. Many of these problems go unnoticed by family members and health professionals, until there is an exacerbation, the

more difficult the process of rehabilitation, provides restricted quality of life and determines early mortality in these children.

Faced with this problem, the study aims to investigate the health conditions of children with cerebral palsy accompanied in the Family Health Strategy.

## METHOD

Observational, descriptive, exploratory, analytical and cross. With sample of the type intentional non-probabilistic composed of 13 children obeying the following inclusion criteria: medical diagnosis of PC; 1 to 12 years of age; be registered in the health strategy program of the family (ESF) in the north of Teresina - PI; absence of genetic syndromes; parental consent. Search we excluded those with: clinical signs of puberty; patients with congenital malformations; mental or psychiatric disorders; made use of corticosteroids within the past 6 months. Home visits accompanied by professional team family health strategy were performed.

The study was assessment tools a semi-structured questionnaire with questions relating to biological, socioeconomic and health. To analyze the functional level, we used the gross motor function classification system (gross motor function classification system, GMFCS) and by palpation and observation of voluntary movements there was muscle tone and its topographic distribution. In assessing the weight-growth structural children underwent assessment of anthropometric measurements according to sex, height / age, weight / age. And in the investigation of health status was found on physical examination vital signs: blood pressure, heart rate and respiratory rate. Cardiac function was assessed by pulse oximetry (O<sub>2</sub> saturation), chest expansion, lung auscultation, type of chest, breathing rate and breathing pattern.

The processing and data analysis was performed using the SPSS® program, version 18.0. Quantitative variables were presented using descriptive statistics: mean, standard deviation, minimum, median, maximum, and 95% and qualitative through ratio. First, the Shapiro-Wilk test was used to assess the normality of quantitative variables, such as the data did not follow normal standards applied nonparametric tests. We used the Kruskal-Walliscom post-hoc test to compare Dun difference between means and to assess the association between the variables applied chi-square test ( $\chi^2$ ) and was statistically significant value of  $p < 0.05$ .

This research was based on ethical principles in accordance with Rule of Human Research of the National Board of Health CNS - 196/96. Submitted to the Research Ethics Committee of UNINOVAFAPI after release by the Commission of evaluation of scientific work of the Municipal Health Teresina, PI Foundation. Parents or guardians received verbal explanation of the research and who agreed to participate signed the Consent and Informed.



RESULTS AND DISCUSSION

Socioeconomic characteristics of children with cerebral palsy, predominance of male children, having dark skin, low paternal education that maternal predominant family income up to 2 minimum wages, live with up to 4 people, receive the benefit of the National Institute of Social Security and the health System is the health plan used by most of the respondents (Table 1).

Table 1. Absolute and percentage distribution of socioeconomic characteristics of the sample (n = 13).

Variables	n	%
Sex		
Mens	10	76,9
Female	03	23,1
Age group		
Up to 5 years	07	53,8
6-11 years	06	46,2
Race / Color		
Black	03	23,1
Brown	10	76,9
Schooling father		
Illiterate	02	15,4
Incomplete primary	06	46,2
Complete primary	02	15,4
Complete high	02	15,4
Incomplete higher	01	7,7
Schooling mother		
Incomplete primary	05	38,5
Complete primary	03	23,1
Incomplete high	05	38,5
family income		
≤ 1 MW	03	23,1
2 MW	07	53,8
2-4 MW	03	23,1
Number of people living in the house		
Up to 4 people	08	61,5
> 5 people	05	38,5
Benefit INSS		
Yes	12	92,3
Not	01	7,7
Health plan		
SUS	11	84,6
Particular	02	15,4

Legend: n = number of cases% = percentage MW - minimum wage. Source: Direct research. Teresina, PI, 2012.

Studies show that no area of particular genre in cerebral palsy. Working with 179 children 1-17 years old with CP undergoing general inhalational anesthesia, the majority were male (51%).<sup>8</sup> In the investigation of post-gastrostomy weight gain in 33 children with cerebral palsy spastic tetraparesis type, found que75,8% were gender masculino.<sup>9</sup> However, in a study comparing the performance of functional activities in children with normal and children with cerebral palsy development, the sample consisted of 33 children with CP, and most women (components 18).<sup>10</sup>

Regarding the prevalence of SUS as access to health services, in a study about the completeness and accessibility in the care of children with cerebral palsy in Rio Grande do Sul, found that most children use the SUS services, however claims as the biomedical monitoring focuses on disease and lack of access to services, endangering the health of these children, leading families often to give up treatment.<sup>7</sup>

In a survey conducted in the Treatment Center and Early Stimulation - NUTEP the Federal University of Ceará, checking understand the meaning of the lived experience of mothers of children with quadriplegia cerebral palsy, it was observed that of the 55 children evaluated most are of low socioeconomic status, being met by the Unified Health System.<sup>11</sup>

According to the Brazilian Constitution a citizen with chronic disease or any person over 65 years of age is entitled to a life annuity, if not be able to support themselves financially, that is, when you are unable to lead an independent life and his family did not have the possibility to sustain lo.<sup>12</sup> What justifies most of the participants receive the benefit of INSS.

Among the risk factors that increase the likelihood of deficits in motor development, socio-economic status of the family is a factor that may affect the development. Some research showed the importance of socioeconomic factors in determining the child's health. It has been considered the mother's education and household income as basic elements, because they are indicators of available resources and knowledge or behavior in relation to health criança.<sup>13</sup>

Under the conditions of pregnancy and childbirth, it appears that maternal diabetes was the highlight of pathology, most of the mothers reported loss of fluid during pregnancy, prevalence of cesarean section, over an hour of delivery and most of newborn infants requiring medical intervention after birth (Table 2).

The analysis of characteristics related to breath, pulmonary auscultation most of the children had diminished breath sounds globally without adventitious sounds, much of the sample did not have thoracic changes and the respiratory pattern is thoracoabdominal normal respiration, namely, rhythmic and regular (Table 2).

Table 2. Characteristics related breathing (n = 13)

Variables	N	%
<b>Auscultation</b>		
BS ↓ NAS	04	30,8
BS↓ HUSKY DIFFUSE	02	15,4
BS + NAS	01	7,7
BS ↓ BASES/ CREPTOS DIFFUSE	01	7,7
BS↓BASES/ HUSKY DIFFUSE	01	7,7
BS↓BASES/ HUSKY SUMMITS	01	7,7
BS↓BASES/NAS	01	7,7
BS↓/ CREPTOS DIFFUSE	01	7,7
BS↓BASES/NAS	01	7,7
<b>Type of chest</b>		
NORMAL	06	46,2
TONEL	03	23,1
KYPHOTIC	01	7,7
SCOLIOSIS	02	15,4
EXCAVATUM	01	7,7
<b>Breathing pattern</b>		
THORACIC TACHYPNEA	02	15,4
TA / EUPNEIC	06	46,2
THORACIC / EUPNEIC	05	38,5

Legend: BS - breath sounds; NAS - no adventitious sounds; TA - Thoracic-abdominal.  
Source: Direct research. Teresina, PI, 2012.

Children with cerebral palsy have diminished breath sounds mostly due to deformities and decreased thoracoabdominal compliance which leads to decrease in vital capacity, abnormal curvature of the spine (scoliosis, kyphosis and kyphoscoliosis the thoracic level), which established easily interfere with the respiratory system and may lead

to bronchial obstruction as they become compressed by large vessels or move in abnormal positions on the pathways aéreas.<sup>14</sup>

The characteristics and respiratory complications in children with chronic encephalopathy were studied, aiming to identify the respiratory characteristics and it could be noted that the diaphragm, the main muscle of breathing, does not work properly. That is, a diaphragm breathing at rest performed correctly, the tóracopulmonar point of view, should the inspiratory phase initially expand the chest, abdomen, and then finally the chest again. Respiratory distress in the PC due to the loss of muscle tone (spasticity) generates poverty movements of the chest and loss of quality - which causes impairment of trade in the alveoli, causing low oxygen supply to the organismo.<sup>15</sup>

This has been confirmed in this study by the presence of decreased breath sounds in all children.

In assessing the expandability through cirtometry, the average of the variables for thoracic mobility in inspiration behaved higher in xifoidiana region; the average of the expiry date had the same result in both the apex measure as xiphoid process. By analyzing the variation in the values were shown to be increasing the axilla (tip) to the umbilical (Table 3).

**Table 3.** Distribution of mean, standard deviation and variation cirtometry in axillary points, xiphoid and umbilical in individuals with cerebral palsy (n = 13).

Variables	Inspiration	Expiration	Variation
	Mean (D.P)	Mean (D.P)	
Apex	57,8 (5,4)	57,2 (5,5)	0,6
Xiphoid process	58,0 (5,7)	57,2 (5,8)	0,8
Umbilical scar	53,9 (9,4)	53,0 (9,6)	0,9

Source: Direct research. Teresina, PI, 2012.

In a study of thoracic mobility, comparing the respiratory quotient obtained by cirtometry made between two different techniques, one with and one without verbal encouragement incentive in healthy adults of both sexes, the values of the results showed were always lower in the region basal (on the 12th ribs), saying that the hypothesis for this finding would be the biomechanics of breath, inspiration occurs in a greater increase in anteroposterior and transverse diameter of the chest particularly of the 5th and 6th ribs and no involvement of the 12th rib on the move the rib cage, which favors a higher thoracic mobility superiormente.<sup>16</sup>

Findings contrary to those of the sample of children with CP were observed in this study.

In case study on respiratory parameters in the thoracoabdominal dynamics, breathing pattern and respiratory muscle strength in individuals with spastic quadriparésica PC was found that the fixed posture of the upper limbs favors shortening of the respiratory muscles, while the abdominal muscles are -If tense, weakened and without action to lower the rib cage. The shortened neck and elevation of the shoulders help to maintain the high rib cage, projecting the sternum. The correction of the thoracic spine raises the chest due to its location and connection of the spine with the ribs, hindering the natural development of the muscles. For the same author, diaphragmatic breathing is characterized by the prevalence of abdominal expansion during the inspiratory phase and the mixed breathing has no clear predominance of thoracic or abdominal expansion in inspiratória.<sup>17</sup>

In a literature search on the respiratory system characteristics in non-progressive chronic encephalopathy of childhood, reports that the inspiratory muscles is shortened, the exhalation is usually elongated and both weakened; the term is not due to passive biomechanics expiratory muscles be impaired; the permanent state of tension associated with poor muscle stretching generates disabilities to expiratory flow, increased functional residual capacity (FRC) and tidal volume. The expiratory muscles and weakened inspiratory associated with increased CRF and vital capacity decreased, make the ribs and the sternum remain in inspiratory position throughout the respiratory cycle promoting an increase in the diameter of the chest, even tending an inspiratory and expiratory relationship 1:1.<sup>18</sup>

In bibliographical study on respiratory complications in patients with cerebral palsy can be seen how these changes thoracoabdominal biomechanics trigger respiratory complications: complacency, defined as the distensibility of the constituent structures of the chest responsible the opening of this structure, inflating lungs is compromised, since the inspiratory muscle is shortened and lengthened expiratory keeping the thorax in a static position and reducing its expansibility distensibilidade.<sup>19</sup>

Data relating to the classification of weight and height according to age, it can be inferred that the sample most children shows the pattern expected for their chronological age (Figure 1).

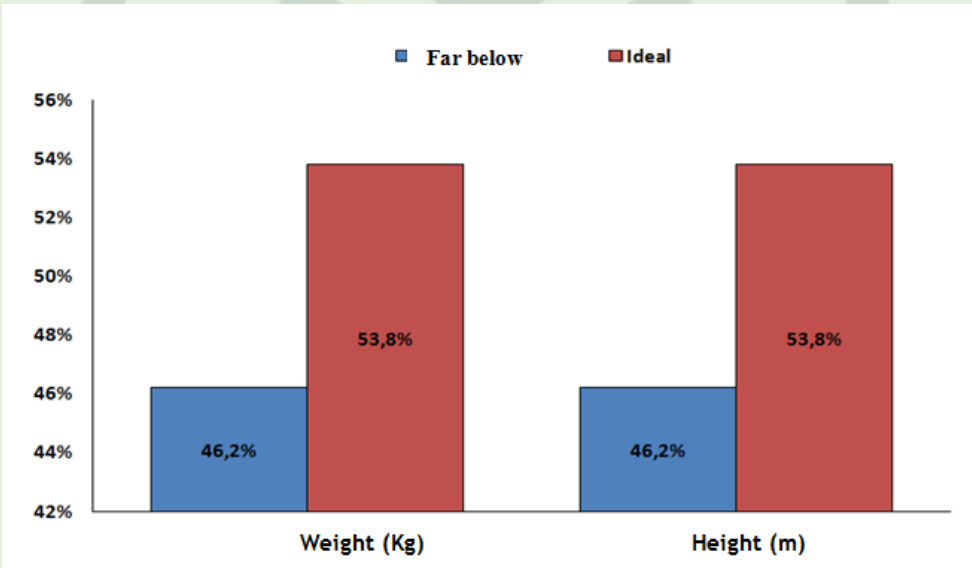


Figure 1. Details of the classification of weight and height for age according to WHO. Source: Direct Research. Teresina, PI, 2012.

In the analysis of linear growth and head circumference twenty-four children with cerebral palsy spastic type hemiplegia, it was found that 10% were less than ideal height for age and weight were too.<sup>20</sup>

The etiology of growth retardation of children with chronic diseases such as PC is multifactorial and may be related to non-nutritional factors resulting from brain malformations or lesions responsible for the inability of child.<sup>21</sup> The type of movement disorder, the severity the PC involvement, especially in relation to self-feeding, the ability to walk, and the degree of limitation in physical activity have been identified as factors that influence changes in growth. Growth retardation is higher in spastic quadriplegic CP, but is also documented in children with diplegia and hemiplegia, even without malnutrition.

All children had spasticity, with quadriparetica distribution in most of the participants, respiratory diseases predominated in the last years especially influenza, medications used systematically anticonvulsants are prevailing the isolated use of



carmabazepina, physical therapy is most frequented by children therapy mainly use the sural-pedal groove for postural correction (Table 4).

Table 4. Absolute and percentage distribution of health-related characteristics (n = 13).

Variables	n	%
<b>Type of Muscular Tone</b>		
Spastic	13	100
<b>Ranked as the topography</b>		
Quadriparetico	10	76,9
Diparetico	3	23
<b>Pathologies in the last year</b>		
Pneumonia	06	46,2
Seizures	02	15,4
Colds	10	76,9
Gastrointestinal infection	03	23,1
<b>Medicines</b>		
Carbamazepine	03	23,1
Valproic acid / Benzodiazepine	02	15,4
Valproic acid	01	7,7
Phenobarbital / Benzodiazepine	02	15,4
Phenobarbital / Carmabazepina	01	7,7
Phenobarbital / Benzodiazepine	01	7,7
<b>Performed therapies</b>		
Physical Therapy / Speech	03	23,1
Physical Therapy	10	76,9
<b>Type of orthoses</b>		
Tala extension	01	7,7
Eaves	04	30,8
Tala Mao / Gutter	01	7,7
Thumb abductor / Gutter	01	7,7
Splint	02	15,4
<b>GMFCS</b>		
Degree II	01	7,7
Degree III	04	30,8
Degree IV	03	23,1
Degree V	05	38,5

Source: Direct research. Teresina, PI, 2012

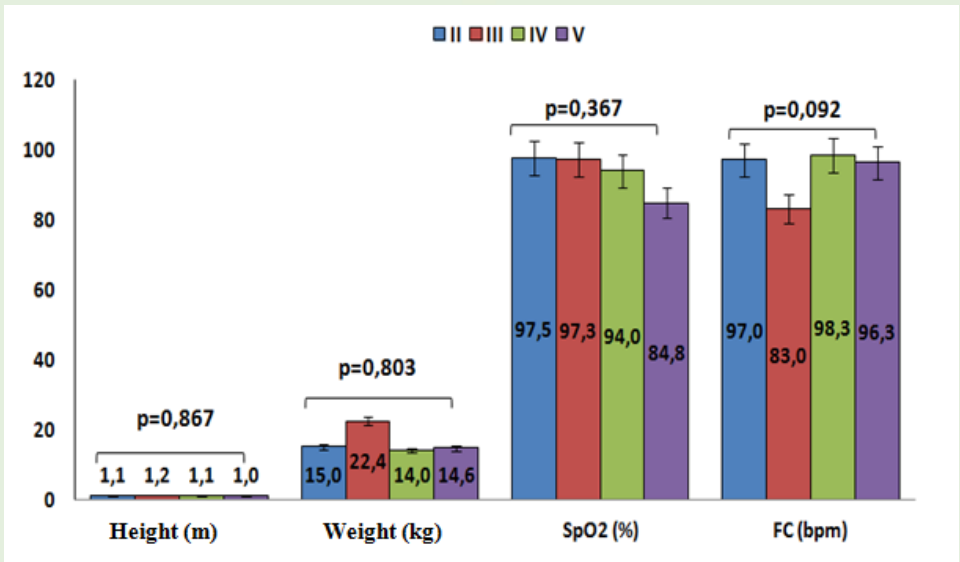
Pulmonary disorders are an important cause of morbidity and mortality in children with CP, predominantly in tetraparetic spastic type or children with GMFCS level V.<sup>22</sup> In studies on the prevalence of respiratory disorders in children with CP, it was found that more than half (56.14 %) of the children studied had pneumonia at some point in their life and 40.35% had disease of the upper airways (rhinitis, sinusitis, sore adenoid, flu) or lower airways (bronchitis, asthma, bronchial dysplasia).<sup>23</sup> Corroborating the findings of this research.

In a survey conducted on the oral health status in 41 patients with cerebral palsy, under 12 years of age in the city of Pelotas noted that the medication most commonly used for these patients are anticonvulsants (53.7%), dominating the gardenal (phenobarbital).<sup>24</sup> The drug treatment in cerebral palsy is limited, in general, the use of anticonvulsants when needed and rarely psychiatric medications for the control of affective-emotional disorders and psychomotor agitation connected disability mental.<sup>25</sup> Na presence of seizures treatment is based on the use of anticonvulsants especially phenobarbital, phenytoin, carbamazepine and valproate. Most cases respond well to monotherapy fenobarbital.<sup>26</sup>

In research for analysis of children with cerebral palsy motor performance with and without bracing, had the results that the use of orthoses provided suropodálicas benefits both qualitative gait parameters, as in gross motor performance of children with CP.<sup>27</sup>

CP patients should be treated by a multidisciplinary team, in which the main therapeutic approach is certainly physical therapy. The role of the occupational therapist and speech therapist is cited by many authors as very important, but complementary service fisioterapêutico.<sup>28-29</sup> Children with CP may have several associated disorders such as epilepsy, cardiorespiratory, orthopedic, gastrointestinal, among others, which change the health, quality and life expectancy of these crianças.<sup>30</sup> In investigating the relationship between functional independence and quality of life of 30 children with cerebral palsy, found that the improvement perceived by parents in relation to health can be inferred by the fact that these children are in interdisciplinary treatment in rehabilitation facilities minimizing the complications of saúde.<sup>31</sup>

Looking at Figure 2 which shows the correlation between the Gross Motor Function Weight, height, peripheral O2 saturation and heart rate, it was found that no influence of the physical function in these respects.



**Figure 2.** Comparative data on average Gross Motor Function To Cerebral Palsy (GMFCS) relative weight, height, SpO2 and HR (Kruskal-Wallis test). *p* <0.05: significant. Source: Direct research. Teresina, PI, 2012.

While systematic review on cerebral palsy, authors consider with respect to the motor frame, motor according to the evaluation protocol GMFCS, children with spastic hemiparesis have better function, followed by children diparesis and finally the carrier quadriparesia. And the higher the motor impairment, reduced physical development of these children.<sup>32</sup>

The Theory of Dynamical Systems recommends that child development stems from the interplay between intrinsic factors such as muscle strength, body weight, postural control, the emotional state of the baby and brain development, and extrinsic factors such as the conditions the environment and task. It also recognizes the maturity level of the CNS as an important component for the development of motor skills.<sup>33</sup> This theory justified interaction of the components analyzed.

**Table 5.** Details of between Gross Motor Function to Cerebral Palsy (GMFCS) for associated diseases (n = 13).

	II	III	IV	V
	n (%)	n (%)	n (%)	n (%)
Pneumonia	01 (16,7)	0,1 (16,7)	01 (16,7)	03 (50,0)
Seizures	02 (100)	-	-	-
Flu	01 (10,0)	04 (40,0)	02 (20,0)	03 (30,0)
Inf. gastrointestinal	01 (33,3)	01 (33,3)	-	01 (33,3)

Source: Direct Research. Teresina, PI, 2012.

Whereas Table 5 that correlates to the functionality provided by the pathologies children with CP, we observed that the greater the motor (5) or more children develop associated pathologies, especially respiratory disorders.

Comparing studies in 36 children with CP the impact of the severity cerebral functional profile through the GMFCS and ASK. Found that the functional skills of mobility, moderate to severe children had functional performance significantly below the light.<sup>34</sup>

The restricted mobility of these children with greater motor impairment allows muscle weakness, decreased chest expansion, reduction in ventilation perfusion, favoring respiratory infections.<sup>19</sup>

The recurrent pneumonia are common disorders in neurological patients, which are triggered by motor amendments associated with potent drugs of which they use as anticonvulsants that can act hindering the ciliary mobility of the respiratory tree and promoting the development of infections.<sup>35</sup>

The respiratory system PC carrier suffers direct and indirect influence of tone disorders, posture and movement. The changes especially of quadriplegic, occurs on global standards and in response to pathological reflex action, so that the fixed posture of the upper limbs generates shortening of the respiratory musculature: the tense and toned abdominal muscles does not lower the rib cage and so does not accelerate the expiratory flow satisfactorily; short neck associated with a high shoulder posture causes the chest to hold it high with sternal projection throughout the respiratory cycle. All these factors add up to make you install a muscle imbalance above and respiratory changes.<sup>36</sup>

## CONCLUSION

Children with cerebral palsy accompanied by staff from the Family Health Program in Teresina, PI, while presenting the most limiting form of the disease in general are able to appropriate health, having as parameter the health of children not affected paralysis brain.

We found that the respiratory system, functionally, is the most influenced by the change of tone and the limitation of movement, emphasis is given also to the presence of diseases in this system, pneumonia and influenza. Although the reports of seizures has been low, the majority of the sample is anticonvulsants. The growth and weight of children are suitable for age and have no relation to the degree of motor impairment.

There is need for more research emphasizing the child with cerebral palsy globally, for greater knowledge about the disease, maximizing the health care of these children and prevention of morbidity and mortality, providing quality of life for children and their families, as many studies report only the motor impairment.

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